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Arboretum Bulletin

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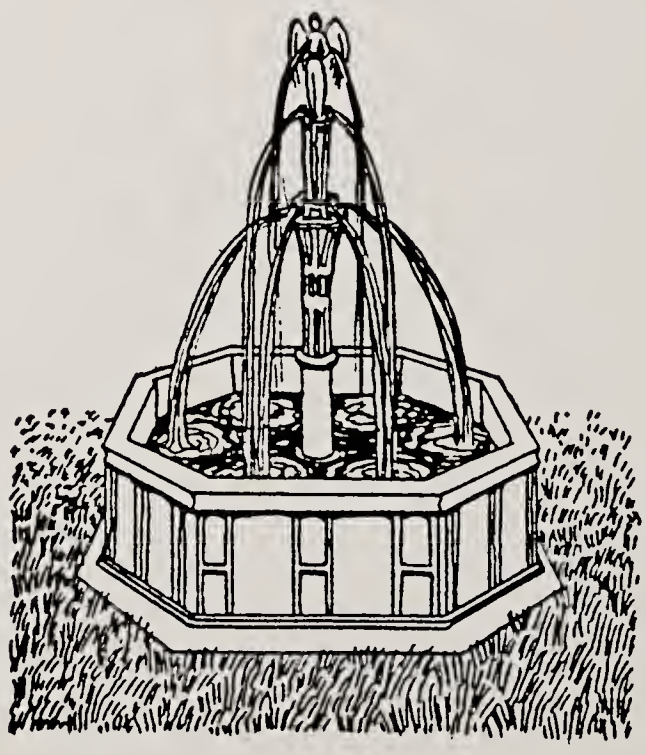
Concerning This Issue...

This issue of the *Arboretum Bulletin* is packed full of interesting and varied articles — from selecting tree care professionals to protecting our mushrooms. Autumn is a good time to organize the garden for next year and Geoffrey Charlesworth's article "Computers and the Home Gardener" will inspire those inclined to keep garden records to run out and buy a computer. Another good fall task is to have one's trees pruned and cared for — John Hushagen has some helpful hints for hunting down the perfect "tree man" in his article on page two.

Dr. Hamilton has written the second article in his mind-elevating series, this one on plants of the winter-rain region. Speaking of winter-rain, Jan Pirzio-Biroli has given a report on the winter-cold of last year and the effects of that weather on plants in the Arboretum and perhaps in your own backyard. Tim Hohn, the "new" curator, lets us know what work has been done in the Arboretum recently on page 25.

The cover article is about the design and planting of the McVay Courtyard at the Center for Urban Horticulture. I hope all of you will take this issue of the *Bulletin* in hand and go to the Center to look at this beautiful and unusual courtyard.

Nancy Pascoe
Editor



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COVER

The McVay Courtyard at the
Center for Urban Horticulture
photo: by Joy Spurr

Choosing a Tree Care Professional

JOHN HUSHAGEN

John Hushagen is a graduate student at the University of Washington's Center for Urban Horticulture. He is part-time staff arborist at the Arboretum and operates North Country Tree Service.

We are just beginning to realize the economic value that trees and woody plants add to residential and commercial properties. A quality landscape may increase the value of a property by as much as 10%. Even here in the lush Pacific Northwest, where we too often take trees for granted, it pays to take care of our valuable plants. And knowing how to locate the competent professionals in the green industry, whose skills and knowledge can enhance any landscape, is a real asset.

Tree care professionals can be divided into four categories; tree service, spray service, landscape maintenance, and horticultural/arboricultural consultants. Tree services mainly work with the pruning and removal of shade, ornamental, and fruit trees. Spray services deal with plant diseases and insect pests and their chemical control. Landscape maintenance firms specialize in turf and shrub management and improvement. Consultants may provide valuable plant disease and pest diagnosis, property analysis, develop appraisals, and represent clients (individuals as well as public and private institutions). They often assist homeowners and land developers in retaining trees during construction. Qualified consulting arborists are scarce, but their knowledge and expertise is vital in creating and maintaining a healthy landscape.

Each of these fields offer specific services and seldom do they, or should they, overlap. The competent operators will know their limits and when to make referrals. In other words, a spray or landscape maintenance company that tries to shift employees to large-scale tree work during the winter is not the company to hire.

Unfortunately for both plants and consumers the tree service industry attracts people whose only qualifications are access to a pick-up truck, a chain saw, and a rusty set of climbing spurs. Tree care professionals take pride in their work and, to many, the ability to prune and shape a major shade or ornamental tree is an art. These people generally belong to (or are

The author working on an Acer campestre.

photo: Phil Renfrow

familiar with) the International Society of Arboriculture (ISA), the American Society of Consulting Arborists (ASCA)* , or the National Arborist Association (NAA). The real pros stay current with the latest research in arboriculture by attending seminars, subscribing to scholarly publications, and talking with other arborists.

An important consideration in choosing a tree care professional is that bigger is not necessarily better. A company with lots of flashy trucks and a large yellow page ad may or may not have knowledgeable, well-qualified personnel. I often recommend small operations. Small services can not afford expensive advertising campaigns. Their business grows by satisfying clients who appreciate quality work and in turn eagerly make referrals.

To hire a professional tree service one can expect to pay a minimum of $25 per man per hour, or $400 for two men for an eight-hour day. Expect to pay more if the job is extremely difficult or risky. Also, dumping fees are usually not included. Be wary of low bids. Consultants charge between $40 - $60 an hour, plus expenses. Professionals take themselves seriously and are not afraid to charge what the job is worth.

Be wary of any immediate request to top your tree. Qualified professionals understand the harmfulness of this practice and will not include the word "topping" in their ads. They will be able to suggest horticulturally sound pruning alternatives to tree butchery. The wise consumer should be as informed as possible about what he or she wants and who should do the work. Check references, look for memberships in professional organizations, and try to discern the estimator's overall knowledge of his field by the way he presents his ideas. Hire only insured tree care professionals — ask to see their insurance card. Even the best arborist can make a mistake or have a rope break at the wrong time.

Shrubs and trees represent a substantial share of the value of any property. That beautiful oak or majestic fir deserves the best. Standards in the tree care industry are slowly improving and quality professionals are growing in number. The challenge today is to put the craftsmen and consumers together to ensure that our landscapes get the most appropriate care available.

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*For a free directory of ASCA members, write ASCA, 700 Canterbury Road, Clearwater, FL 33546

Computers and the Home Gardener

GEOFFREY CHARLESWORTH

Geoffrey Charlesworth is a retired math professor and a full-time gardener. He is past chairman of the Connecticut chapter of the American Rock Gardening Society and author of various articles on rock gardening. He is currently writing a book on gardening that may be published next spring.

In order to use a computer satisfactorily for keeping gardening records you need, besides the computer and keyboard, a black and white video screen (color adds a little zip but you don't actually need it) and a printer. My printer is dot matrix which has the advantage of being faster and less expensive than a letter quality printer, but the visibility is lower. The printer is needed to give you a 'hard copy' or 'printout'; which is simply a printed version of the information you need. You can read the information on the screen, but you will usually want it in a form you can take into the garden or show to your friends. It is these printouts, brought up-to-date as needed, that make having a computer such a joy.

In addition to the 'hardware' (the actual computer components) listed above you will need some 'software'. Software is a computer program and can be obtained where you bought your computer or through one of the many ads that appear in the numerous computer magazines. The main one you will need is an information management program. Essentially this acts like a box that holds file-cards. You type into the computer ('enter') the names of plants along with all the information you want to have available. The program must be able to alphabetise the information (and/or sort it by date planted, height, etc.), store it, and then be able to retrieve it. The retrieval may be either on the screen or via a printout. You would probably only use the screen if you wanted to remind yourself of a single item; otherwise it pays to print. The information to be typed into the computer is broken down into small pieces which are usually called 'fields'. For instance you might want to record a *Rhododendron keleticum* you just purchased at a place we will call Northwest Nursery for $12.50. The catalog tells you it is purple and grows to a height of 3 feet. You have planted it in a part of your garden you call "The Glade". Using the information management program, follow the instructions for setting up a file; then 'open' the file by following the 'menu' program. (This all becomes very clear when you actually sit down in front of one of these machines. *-Editor's note*) The plant's file will probably consist of the following fields: genus, species, origin, price, height, color and location in your garden. Next you want to enter the rest of the

information about the plant you bought and any others too. Again the software menus will indicate exactly how to do this. You may have 100 or 5,000 plants you want to record in this way. Obviously if the computer just printed them out in the sequence you typed them it would be very confusing. This is where one of the computer's most powerful uses becomes apparent. In the process of setting up the fields for the file, one or more of them is designated a 'key field' or some such name; this is a field the computer is going to alphabetise for you. In the above example it would be useful to designate genus and species as fields to be alphabetised.

In the example there are seven fields. If you think you might need more check before you buy the software to be sure that it is capable of doing what you want it to do. Choose a program that offers you much more flexibility than you think you will need; once you realise the power of the computer you will find ways of using it you hadn't dreamed of. Next consider how many plants you may want to record; again the software and the storage capability of the computer should be adequate to handle at least double your most aggressive expectations. Give the salesperson a very liberal estimate when you discuss both software and hardware.

You might think that if it is all so easy you could enter twenty or thirty fields. However you have to consider the work involved in entering all that information. You could indicate a reference to a plant description instead of typing it verbatim. Also when you print out the information it will probably be in columns, such as in figure A, at the bottom of this page.

You will most likely want to have all the information about one plant on one line. Some of the interest of your final printout will be lost if it is difficult to read and absorb. It is dangerously easy to do a snowjob on yourself if you have too much information pouring off the machine. This fear is mitigated by the fact that you can usually choose to print selected parts of the information stored on the computer. However, if you will never want to print it don't bother to store it.

If you have a morbid interest in the rate of cash outflow as your hobby progresses you can usually have certain numerical fields totalled and other arithmetical operation performed. You could end up with a printout that looks like figure B. The arithmetic is done by the computer of course!

I have also found it useful to keep a record of plants by location such as Bed A, Bed B, etc. The software you buy should be able to select all the records which have Bed A in the field set up for 'bed' and print them in alphabetical order if you wish. You can also obtain the records in the order in which they were entered. This is useful if you have listed the plants when they were put in the garden. For instance if the bed is in the form of a narrow rectangle the plants could be listed from left to right. This kind of record could act as a map of the garden. You can think of modifications if the beds are different shapes by subdividing them into smaller regions.

Figure A

Genus	Species	Origin	Price	Height	Color	Bed
Rhododendron	keleticum	Northwest	12.50	3 ft.	purple	Glade

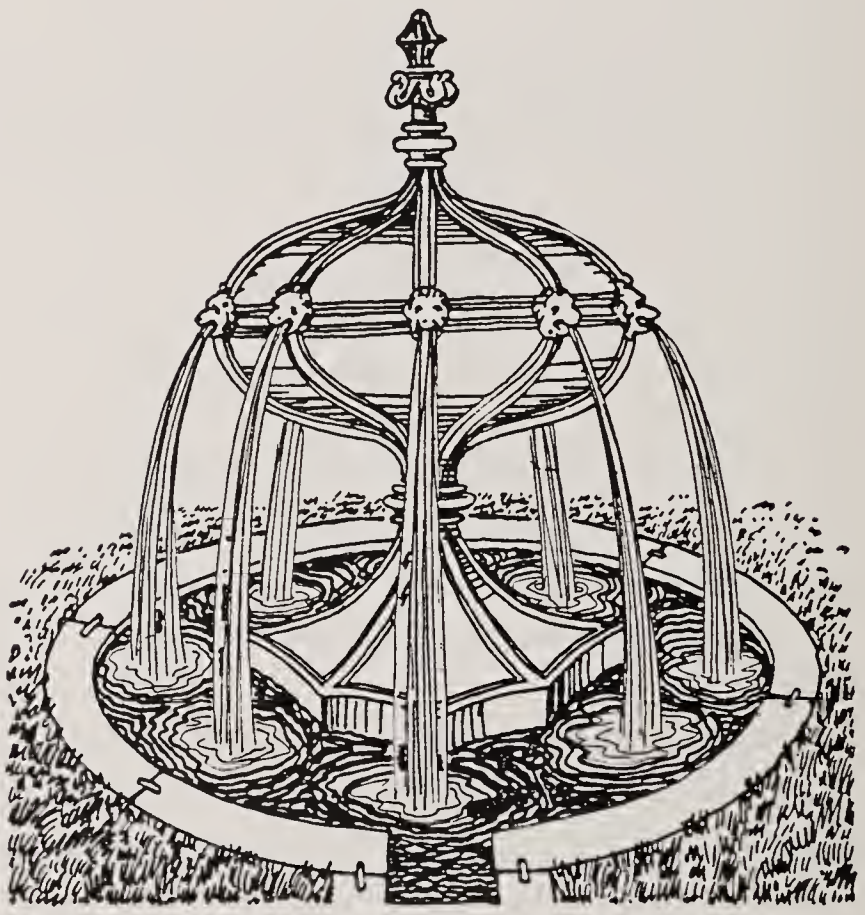
Figure B

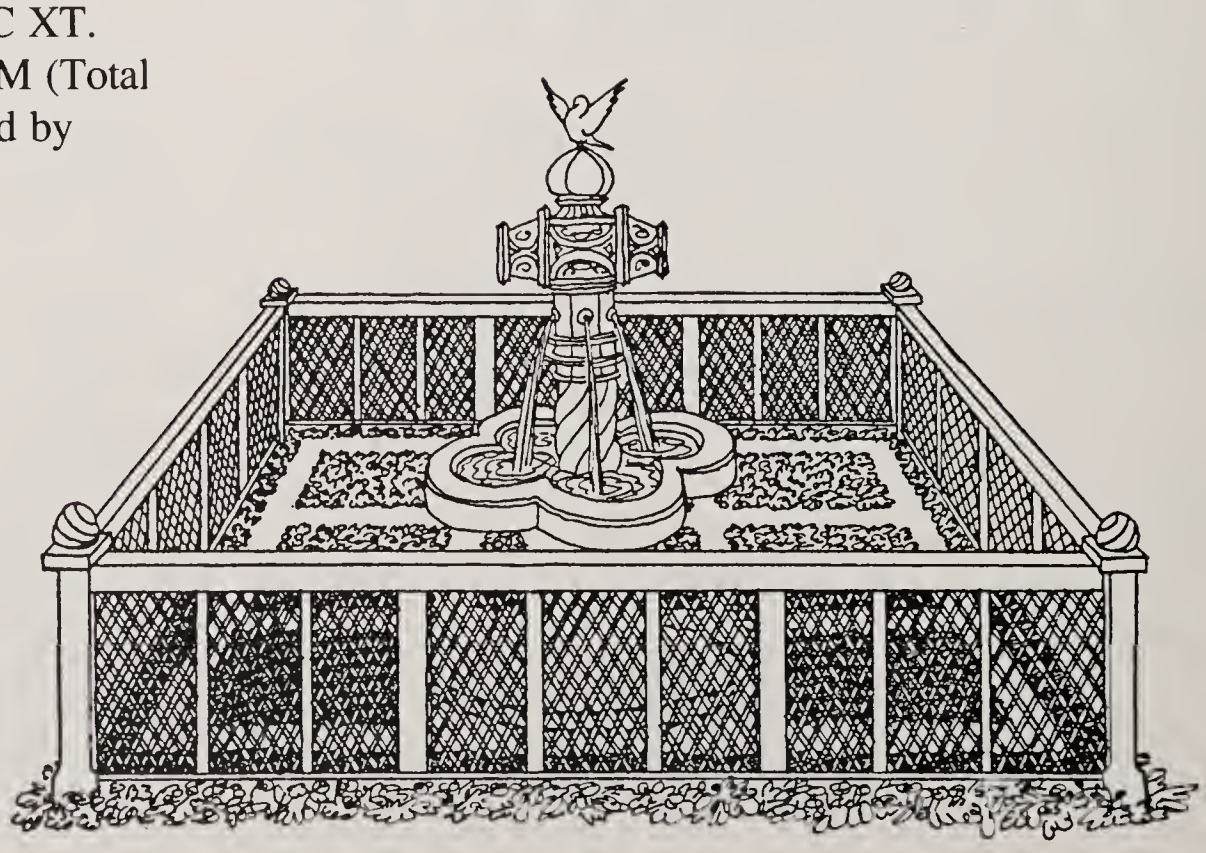
Genus	Species	Unit Price	Number	Total Price
Rhodo.	keleticum	12.50	5	62.50
Rhodo.	vaseyi	7.50	3	22.50
				= 85.00

Other ideas for selecting lists would be plants chosen by botanical family, country or origin, plant society or nursery of origin and so on. I once had a friend who claimed to detest making lists; whether this was because the process was boring or because there was nothing to learn from a list was never made clear. In any case the computer makes list-making a simple job and when you have the information you are often wiser and usually happier. Especially as a list can be updated with no extra trouble so that comparing lists made at different times is also instructive.

The most useful lists I have made are the lists of seeds sown. Seeds arrive all through the fall and winter; the computer keeps an up-to-date alphabetical list of the names, origin, plant description and sowing date. I leave fields vacant for the germination date, the transplanting date and the number of plants I get. These can be entered on a rainy day — gardening always takes precedence over record keeping. If you only sow ten packets a year you don't need a computer, but if you sow a hundred, it is very helpful. If you sow a thousand or more as I do, you may have to split up the files to cut down on the time it takes to merge a few new names. I assume that anyone reading this is wondering whether or not to buy a computer and this type of software. Get the computer that offers the largest amount of memory you can afford; get the software that does all the things you want it to do and more. A computer is like a greenhouse — before a year has gone by you wish you had one twice the size.

(Note: The author uses an I.B.M. PC XT. This has 128KB. His software is TIM (Total Information Management), published by Innovative Software.)





Still Waters

LESLIE NORTON

Green pastures and still waters now, as in the days of the Hebrew poet, restore the soul. This a fundamental truth, and has profound practical importance. *-W.A. Stiles*

Of the essentials for man's life on earth, next to the air we breathe, surely water is our most immediate necessity. That it is so intricately interwoven with aspects of our lives other than the physical, is perhaps not obvious.

We may know in our minds where the water main runs beneath the street, and where the faucets are, but the presence of a pool or a tiny stream or even a concave rock that has collected the rain and reflects the sky, speaks to us in ways deeper than words or thought. Perhaps it says to our subconscious mind, "Relax, water is at hand, your thirst can be quenched, you can live."

Water has been so much a part of life from its beginning that it is no wonder our culture is replete with its symbolism. In the Koran, Paradise is described over and over as "gardens watered by running streams." In our own country there is hardly a church in which water is not used symbolically in some way. Even our everyday speech is filled with its metaphors. We say, "still waters run deep," and "I washed my hands of the matter." Thomas Jefferson is said to have laid the brick walks in his garden with deliberately uneven surfaces so that after a rain puddles would remain for the refreshment of birds. It is said that he liked to watch the birds cavort and splash, and I can imagine that in feeling their need he was subconsciously acknowledging his own.

The great reservoirs of old Spanish gardens filled a practical purpose, of course, but they also must have given great comfort and assurance during hot summer days. The beautiful formal ways in which they were incorporated into the garden landscape tells us they were treasured for more than their utility. In Moorish gardens of Spain and other arid lands, the colorful tiled channels of small rivulets indicate the preciousness of water and the fulfillment of a deep need that its presence provided.

Even the price of real estate tells us of our instinctive affinity for water. Land bordering a lake or stream, or having a view of sound or ocean, is for these reasons more valuable. This seemingly universal appeal makes me wonder if we have a "stay-near-water" gene through which we are hearing the faint echoes of a survival mechanism of long ago ancestors.

Every garden, however landlocked, can have the restorative presence of water. A shallow earthenware bowl with a few pebbles in the bottom can contain enough to mirror a cloud and catch a breeze, and gives us its message.

In my own garden, especially in the evening after a warm summer day, to hear the drip and splash of the tiny stream into the dark, moss-covered pool does more than anything else could to make this small piece of Earth seem a Paradise. It makes the garden complete, and I know then something of the feeling of the ancient Hebrew poet.

Plants of the Winter-Rain Regions I:

General Vegetation

DR. CLEMENT HAMILTON

In the preceding issue of the *Arboretum Bulletin* I introduced readers to world climate types and how they are conveniently described by Walter climate diagrams. That began a series of articles in which I and my colleagues at the Center for Urban Horticulture plan to discuss the plants of the Washington Park Arboretum and their biogeography, climate, vegetation associations, landscape use, and culture. We also plan to present this material periodically as part of the "Nature into Landscape" class series taught at the Arboretum this fall.

The first climate type to be covered is that of the winter-rain regions (Zone IV in the Walter system), often refered to as "mediterranean". It is appropriate that we commence with these areas since the climate pattern features an abundance of winter rain, a degree of summer drought, and relatively mild winters, all characteristics of the Pacific coastal United States. Plants native to such regions are already well adapted to the seasonal pattern and therefore usually require relatively low maintenance in summer. Anyone tired of watering the garden throughout summer should be extremely interested in plants of the winter-rain regions!

There are five areas in the world with winter-rain climate (see Fig. 1).[1] The two largest are the Mediterranean region and the Pacific United States. Three smaller areas, in the southern hemisphere, are central Chile, the southern tip of Africa, and southern Australia (plus Tasmania). Notice that they are all more-or-less on west coasts of continents at similar latitudes, about 32º to 45º. Equatorward lie substantial deserts and poleward are areas of greater summer precipitation. The maritime influence is important to winter-rain climates,

[1]Some ecologists define mediterranean climate very strictly, excluding all areas where the temperature falls below freezing more than 3% of the time; this leaves out western Washington and Oregon, for instance. For our purposes the more inclusive, Walter "winter-rain" circumscription is more useful, especially as plant hardiness ranges are almost always greater than their actual natural ranges.

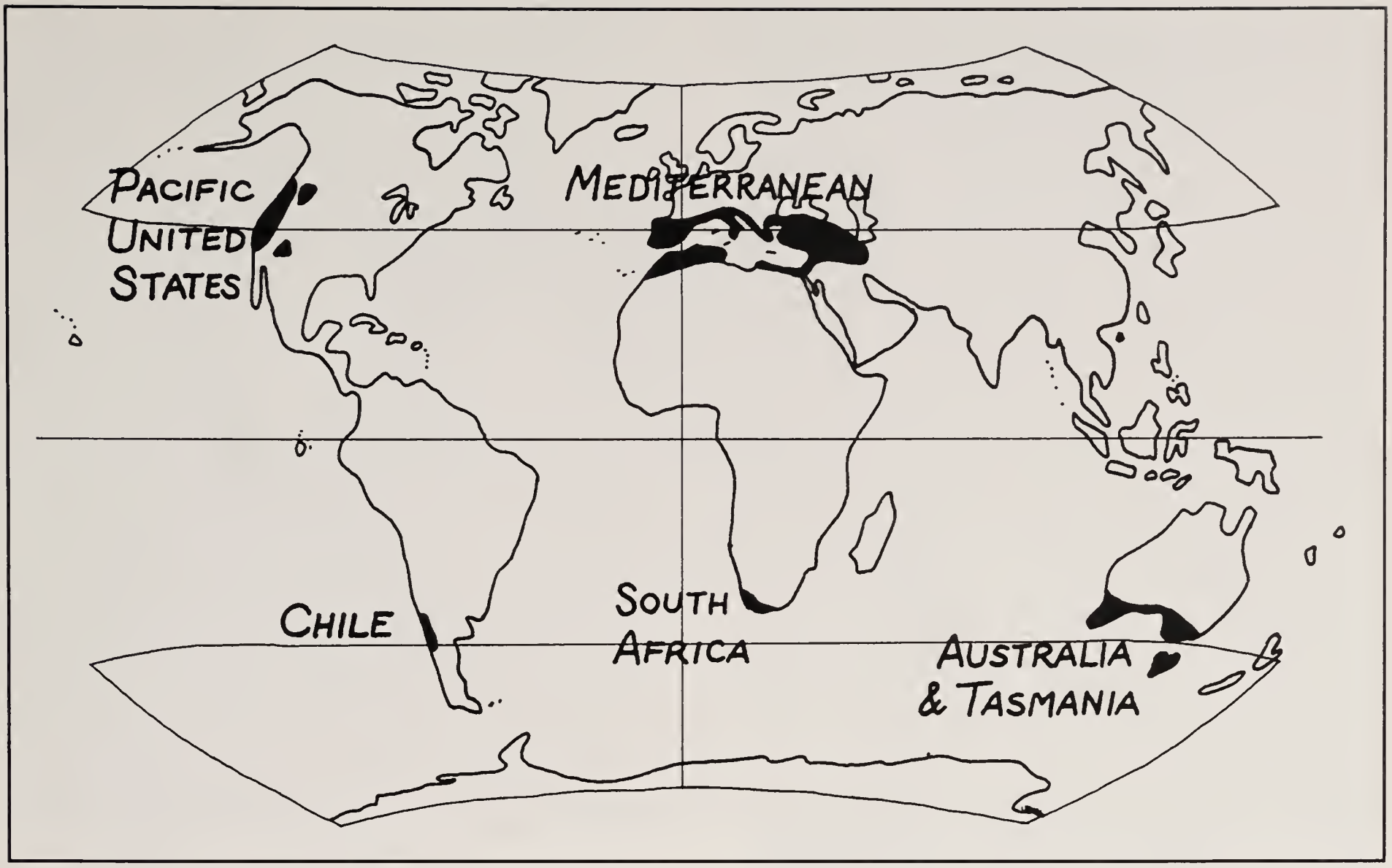


Figure 1: The five areas in the world with winter-rain climate.

so nowhere do such conditions extend far inland. Although all five share a similiar weather system and vegetational themes, they have different floras that have evolved independently of one another.

In this article I will discuss 1) common plant adaptations, 2) floristics and evolution in the areas, and 3) in a very general way, the winter-rain plants of the Washington Park Arboretum. Future articles will treat in much greater detail the plants of each geographic region.

Climatic differences among (and within) the five regions will be discussed in greater detail in our class series. Suffice it now to say that there are differences, especially important to those of us making educated guesses about the hardiness of plants!

Winter-Rain Plants

The most striking aspect of mediterranean vegetation is the preponderance of deep-rooted sclerophyllous evergreen woody plants and annuals. Sclerophylly refers to hard leaves with anatomical adaptations that ensure efficient photosynthesis as long as even a little water is present and, at the same time, protect the plant against drought damage. Annuals, particularly winter annuals, comprise up to 50% of the flora in the warmest mediterranean regions; they grow and reproduce during the mild winters and suspend activity during the harsh summers. Since winter cold is more severe and summer drought is less extreme in areas such as Washington and Oregon, the winter annual phenomenon is not nearly so pronounced. Most of the following discussion pertains to the warmer areas more subject to severe drought.

Botanist Peter Raven and paleobotanist Daniel Axelrod each published, in 1973, papers that shed considerable light on the evolution of the floras of the five mediterranean regions.[2] Perhaps their most fascinating conclusion is that these floras are of relatively recent origin and owe their existence to the polar ice caps. As the earth cooled and much of the available water became ice, the oceans cooled relative to

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[2] Raven, P.H. "The evolution of mediterranean floras"; and Axelrod, D.I. "History of the mediterranean ecosystem in California"; In DiCastri, F. & H. Mooney, eds., *Mediterranean Type Ecosystems: Origins and Structure*, Springer-Verlag, N.Y.

Mahonia nervosa, *characteristic of the Pacific United States.*

photo: Whitie Marten

the adjacent continents. This resulted in a greater concentration of summer oceanic dry high pressure zones with the concomitant cold offshore currents, which in turn caused summer drought.

So where did all these sclerophyllous plants come from? They were actually part of more diverse dry zone communities which included deciduous shrubs, such as are now found in parts of northern Mexico. As summer drought intensified, deciduous species retreated, leaving the "preadapted" evergreen sclerophyllous trees and shrubs. The winter annuals diversified later and are an excellent natural laboratory for the study of recent plant evolution.

The relative youth of winter-rain ecosystems suggests that the five regions' floras have evolved fairly independently of one another and should be floristically distinct, i.e. contain different species and genera. This is generally borne out.

Northern hemisphere mediterranean floras (Pacific United States and the Mediterranean) share genera such as *Acer*, *Clematis*, *Cornus*, *Pinus*, *Quercus*, *Salix*, and *Viburnum*. This genus-level, floristic resemblance (the most between any two winter-rain regions in the world) appears to reflect the past geographic proximity of the New World and the Old before the Atlantic Ocean widened. Thus North America and Europe have a related flora, both temperate and tropical, from which the mediterranean vegetation later developed. Fossil floras indicate that genera such as *Clethra*, *Ficus*, and *Ilex* were once shared by the Mediterranean and Pacific United States. At the species level, the relationship is even more distant, reflecting independent evolution since the Atlantic widened significantly; within the genus *Quercus,* for example, the Californian species are not closely related to those of the Mediterranean.

Many woody genera are unique to one or the other region. Essentially Mediterranean genera such as *Cotinus*, *Laurus*, and *Olea* were apparently derived from Old World tropics. In California, *Arctostaphylos*, *Ceanothus*, and *Umbellularia* are from the New World tropics. Even greater differences are reflected by the more recently diversified annuals: in California the families Boraginaceae, Cruciferae, Hydrophyllaceae, Onagraceae, and Polemoniaceae have gone to town, but in the Mediterranean the annuals have diversified in the Caryophyllaceae, Leguminosae, and Umbelliferae.

Southern hemisphere mediterranean regions are even more floristically distinct from one another and from the north. All three — Chile, South Africa, and southern Australia — owe their floristic development primarily to adjacent tropical regions, mainly because there is very little temperate land area in the southern hemisphere to serve as source areas.

In central Chile, woody families such as Anacardiaceae, Bignoniaceae, Euphorbiaceae, and Myrtaceae are obviously tropical in origin, as are the dry-adapted Agavaceae and Cactaceae. In addition, some north temperate groups have "mountain-hopped" down the Andes; these include *Alnus*, *Berberis*, *Castilleja*, *Epilobium*, and *Ribes*. However, none of the major central Chilean woody groups — e.g. *Calceolaria*, *Escallonia*, and *Fuchsia* — is found in the western United States.

Cistus aguilari, *a native of the Mediterranean, in the Arboretum.*

photo: E.F. Marten

The Southern African Cape flora is likewise dissimilar to that of the Mediterranean. Proteaceae, Restionaceae, and Penaeaceae are important groups. Southern Australia also has its share of Proteaceae and Restionaceae but also features derivatives of characteristic Australian taxa such as *Acacia* and *Eucalyptus*.

Peter Raven draws four conclusions regarding winter-rain evolution in the southern hemisphere: 1) the flora of each area evolved in isolation; 2) it evolved from tropical predecessors; 3) the Antarctic climate never was arid enough to permit widespread passage between South America and the Old World; and 4) similarities between South Africa and Australia (e.g. Proteaceae) may reflect a common tropical ancestry.

Plants in the Arboretum

Now that we understand winter-rain plant evolution in the five regions, we can briefly begin to examine plants in the Washington Park Arboretum. A quick count reveals the following numbers of genera and species from the five regions: Mediterranean - 83 genera/196 species; Pacific United States - 72/184; Chile - 20/28; Australia and Tasmania - 11/20; and South Africa - 2/2. Southern hemisphere numbers may be artificially inflated because some of the taxa actually may grow outside the winter-rain areas.

Major genera from both the Pacific United States and the Mediterranean in the Arboretum are *Abies*, *Acer*, *Juniperus*, *Pinus*, *Platanus*, *Quercus*, and *Rhamnus*, several of which were mentioned above. Genera characteristic of the Pacific United States alone include *Arctostaphylos*, *Ceanothus*, *Cupressus*, *Mahonia*, *Penstemon*, and *Ribes*. Primarily Mediterranean genera are well represented in the Arboretum and include: *Cedrus*, *Cistus*, *Cytisus*, *Erica*, *Genista*, *Halimium*, *Helianthemum*, *Lavandula*, *Phillyrea*, *Phlomis*, *Ruscus*, *Spartium*, and *Thymus*. These are several genera of plants that are more capable, under summer drought conditions, of thriving than many of our standard landscape plants.

Future articles in this series will examine, in much greater detail, plants of each of the five regions. The reader will learn where in each region the climate most resembles that of Seattle, natural habitats and plant associations involving Arboretum species, and consequent aesthetic and cultural observations we hope will prove particularly useful to creative landscapers.

The McVay Courtyard at the Center for Urban Horticulture

IAIN ROBERTSON

Iain Roberston is the Staff Landscape Architect at the Center for Urban Horticulture and Assistant Professor in the Department of Landscape Architecture at the University of Washington. He was project landscape architect on the Jones and Jones design team for the Courtyard.

The expression "a camel is a horse designed by committee" is frequently cited by designers in an attempt to discourage participation by others in the design process by implying that the result is invariably negative. The cooperative venture which helped to create the McVay Courtyard clearly shows that not all designs which are the result of collaboration between the design team, the client and other experts necessarily result in ungainly products such as "the ship of the desert".

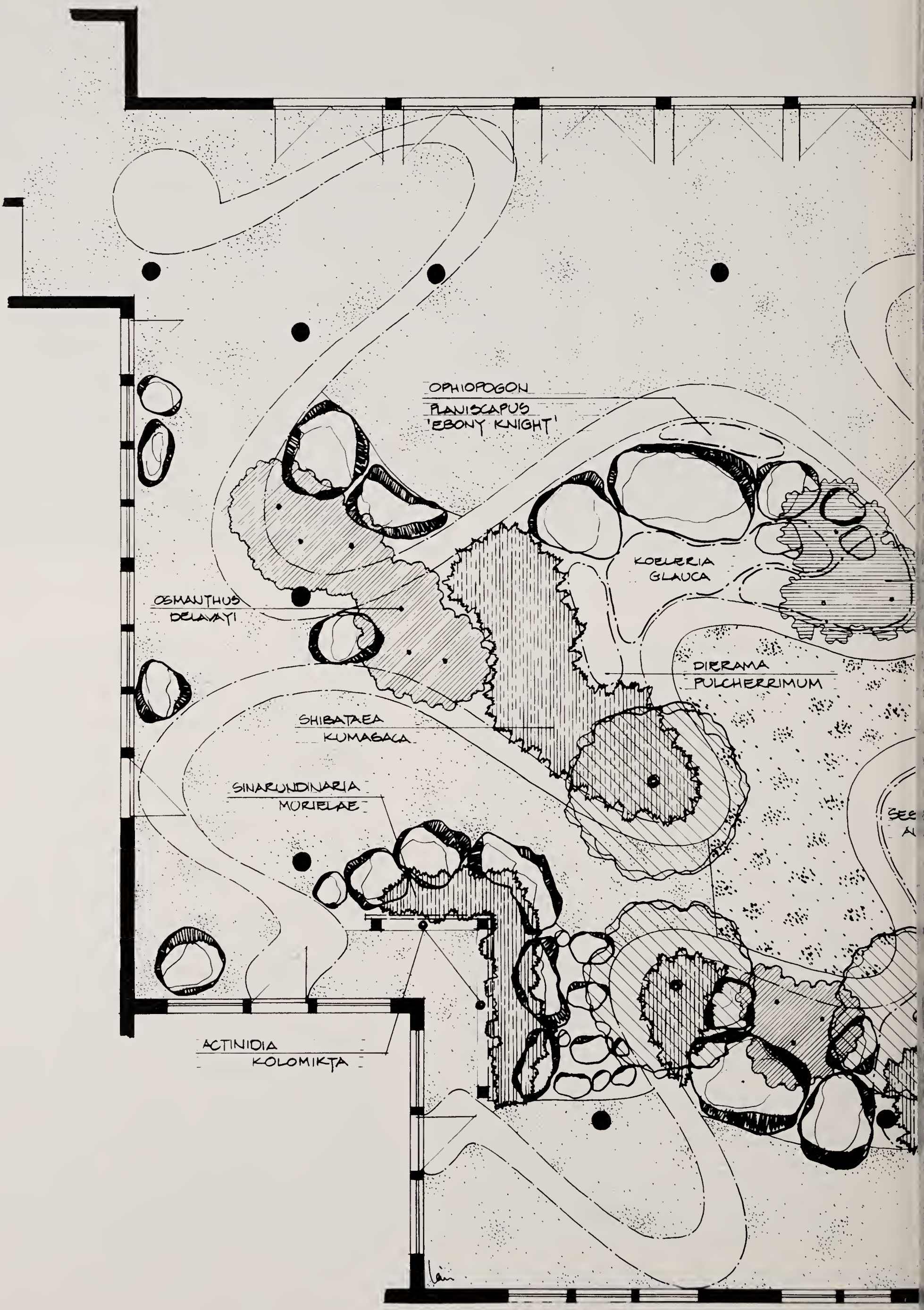
Small courtyards are notoriously difficult to design because they frequently contain a great diversity of activities within a confined space. The McVay Courtyard is no exception. The functional requirements for the Courtyard design were that it should permit easy circulation into and between the surrounding buildings and comfortably accommodate large numbers of people who might wish to leave the Conference Hall during program breaks, while at the same time retain an intimacy of character which would make it a pleasant place for people to sit in the sun and enjoy lunch. Further, it was requested that the design avoi the trap of creating a small sitting space which, when occupied by a single individual, might appear to be private and discourage others from using it. The aesthetic goals of the design were that the space be visually pleasant from all views, demonstrate an integration of the building and the landscape, and use plants in a way that was pleasing while minimizing maintenance requirements. Finally, in symbolic terms, the Courtyard was required to represent the mission of the Center by exploring appropriate ways of using plants in the urban environment. It is not the purpose of this article to describe the design of the Courtyard in detail, however, a few word must be said about the design concept and how it was expressed in the completed work to place the discussion of the plants in its proper context.(See plan on pages 14 &15.)

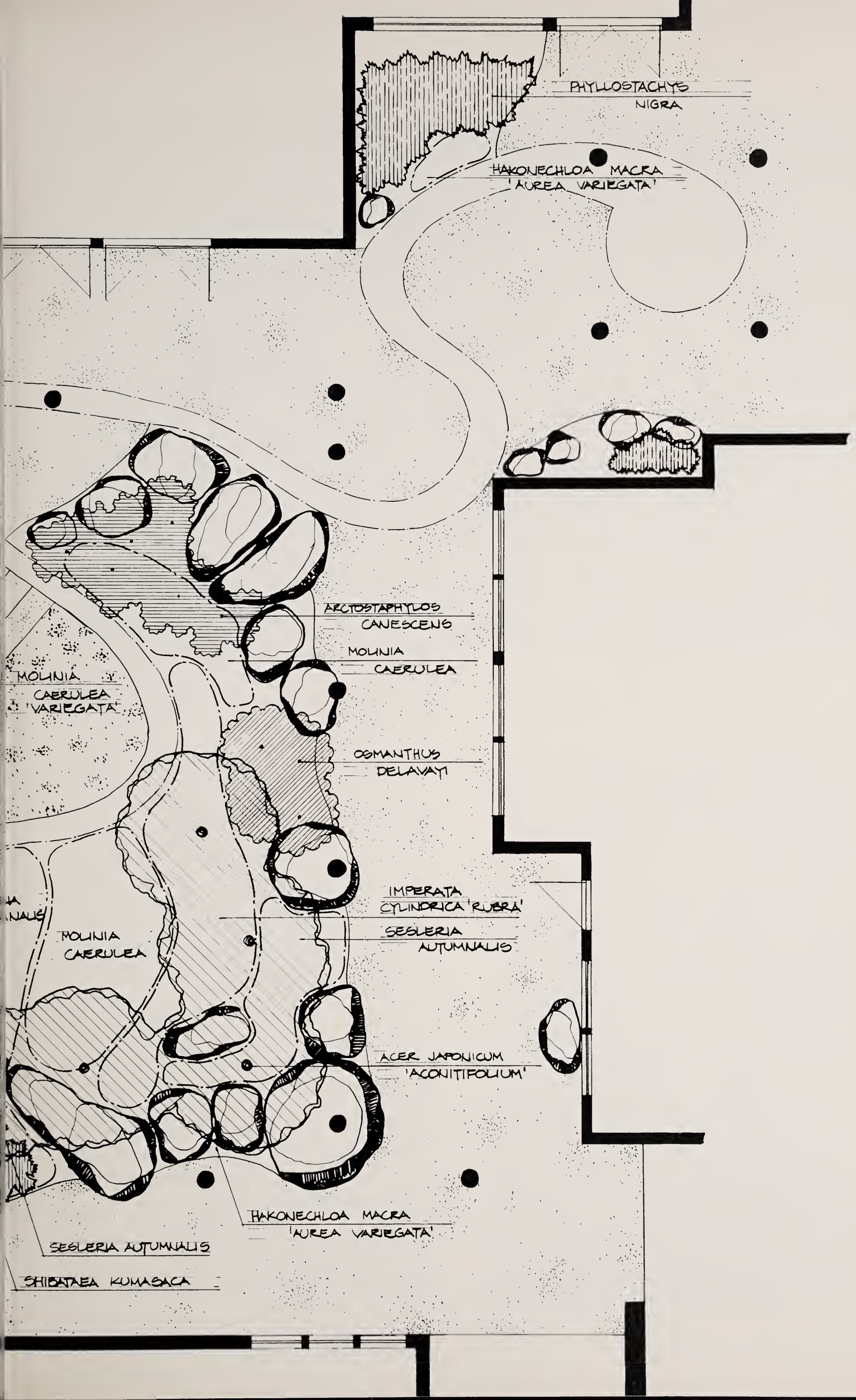
Briefly, the Courtyard contains two concrete bands which flow from the principal entrances into the two doors of Merrill Hall. These are textured to represent the riffles and eddies of water flowing over and around the large rock obstacles. These two "streams" may be considered to represent the streams of

Main entrance to Courtyard, featuring Phyllostachys nigra, *black bamboo and* Hakenechloa macra *'Aurea Variegata'.* *photo: Joy Spurr*

horticultural knowledge combined in the Center's work, one being the rich botanical legacy of plant hunters who brought back from all corners of the world the ornamental plants that are now familiar features of our landscapes, and the other being the scientific knowledge of taxonomists, biologists and horticulturists who have studied and grown these plants. Contained between the streams and large rock outcroppings are two islands of plants with different microclimatic requirements, one being a relatively hot and dry site, and the other cool and shady. The rocks and the plant beds separate the central seating area from the main gathering space in front of the Conference Hall and direct circulation around the perimeter of the space. They are placed so that the soil can be mounded to emphasize the separation and enclosure of the bowl-shaped sitting area. This is divided by bays and promontories which allow it to be used by several groups without disturbing each other. By depressing the sitting area and mounding the soil, those who use it are brought into closer contact with the adjacent plants.

In terms of the plant palette used, it was decided to restrict the range of species almost exclusively to plants that were grasses or had grass-like foliage. This common characteristic was used to unite the design while allowing different leaf shape, color and texture to provide subtle variety within a unified whole. The deliberate restriction of the palette to a specific group of plants is one of the best techniques for ensuring that a design read as a whole rather than a random and confused collection of plants that possess very few characteristics in common (the later being an all-too-frequent error made by landscape architects). It was also assumed that restricting the range of plants would result in a distinctly different design which would encourage people to notice and observe its details. With this in mind, the plants for the Courtyard were restricted to a single variety of tree, one vine, two shrubs, three bamboo species, and a ground plane composed of six grasses, four grass-like plants, and a variety of bulbs. Within this range of plants, the design seeks to create a functional and aesthetically-pleasing space with a distinctly


OPHIOPOGON
PLANISCAPUS
'EBONY KNIGHT'
KOELERIA
GLAUCA
OSMANTHUS
DELAVAYI
DIERAMA
PULCHERRIMUM
SHIBATAEA
KUMASACA
SINARUNDINARIA
MURIELAE
ACTINIDIA
KOLOMIKTA


PHYLLOSTACHYS
NIGRA
HAKONECHLOA MACRA
'AUREA VARIEGATA'
ARCTOSTAPHYLOS
CANESCENS
MOLINIA
CAERULEA
MOLINIA
CAERULEA
'VARIEGATA'
OSMANTHUS
DELAVAYI
IMPERATA
CYLINDRICA 'RUBRA'
SESLERIA
AUTUMNALIS
MOLINIA
CAERULEA
ACER JAPONICUM
'ACONITIFOLIUM'
HAKONECHLOA MACRA
'AUREA VARIEGATA'
SESLERIA AUTUMNALIS
SHIBATAEA KUMASACA

Japanese Blood Grass, Imperata cylindrica *'Rubra'.*
Drawing:Sylvia Chesley Smith

different personality.

The tree, *Acer japonicum* 'Aconitifolium', will form a small, informal grove over the southern part of the courtyard. As the varietal name suggest, its leaves are finely dissected in a manner reminiscent of those of the aconite. These will create a light and delicate canopy which will be kept open and airy through pruning and will form a light tracery over the southern part of the Courtyard in winter. This tree has small, deep red flowers in spring which open with the new leaves and bright red fall foliage.

Each of the two shrubs serves a very different design function. *Osmanthus delavayi*, a relatively slow-growing, finely-textured evergreen plant with dark green leaves, is planted in groups which will be sheared to form dense, rounded masses. These will reflect the forms of the adjacent rocks above which they will rise and add to the sense of enclosure within the seating area by screening it from the surrounding circulation routes. In contrast, the open growth of the other shrub, *Arctostaphylos canescens*, will be accentuated through careful pruning to form loose open masses, allowing views of its sculptural, wiry stems which are a deep purple color. The steps down into the sitting area passes between two masses of *Arctostaphylos* while the ramp up to Merrill Hall passes under the maple canopy.

On the shady, east side, of the steps the shrubs are underplanted with *Molinia caerulea*, the purple moor grass, which has purplish fall flowers. On the sunny side, a silver variegated form of this grass is used along with the glaucous blue grass, *Koeleria glauca*.. These grasses will blend with the purple stems and light, glaucous leaves of the adjacent *Arctostaphylos canescens*. The *Molinia* and *Koeleria* tend to be clump-forming grasses and if they do not spread sufficiently to cover the ground in this area, an experimental planting of prostrate willows will be planted beneath them.

Of the three bamboo species, two are tall-growing and the third is low-growing. *Phyllostachys nigra*, black bamboo, has been planted in the two beds at the entrance to the Conference Hall. The plants will be allowed to completely fill the beds, but will be thinned to prevent the clumps from becoming dense and visually impenetrable. Already this plant has shown its vigor by sending up new canes ten or twelve feet tall within a few months of being planted, and it now over-tops the adjacent roofs to wave gracefully in the breeze. The black color on the canes appears during the second year as they mature and will be set off against one of the most brilliant of yellow variegated plants, *Hakenechloa macra* 'Aurea Variegata'. This is a deciduous perennial which grows about 12 inches tall. It will be allowed to spread slowly and cover the ground throughout the bed. Interspersed among it at the front of the bed is the black-leaved *Ophiopogon planiscapus* 'Ebony Knight' which will add to the contrasting green, black, and yellow colors in this area. The same plant is used in the northern part of the courtyard where it will eventually form a dense, continuous mass in the crevices and around the bases of the rock masses.

Another tall bamboo, *Sinarundinaria murielae*, will be planted this fall against the trellis in the narrow bed by the entrance to Merrill Hall. It is a plant that suffers from a severe identity crisis as it has been classified into four different genera and given at least six different species names. We may use the most

Above: The tall grass, Molinia caerulea, *against a rock out-cropping, as seen from the benches.*
Below: the whimsical "water motif" with marble found on the Courtyard benches.

photos: Joy Spurr

common of these, *S. murielae*, while noting that the American Bamboo Society prefers *Thamnocalamus spathaceus*. It is a tall, clump-forming bamboo with long, slender leaves held on arching canes and has been described as the quintessential bamboo. The green leaves and canes will contrast with the broad, boldly cream and pink -variegated foliage of *Actinidia kolomikta*, a deciduous vine planted against the trellis. This plant is closely related to the Kiwi fruit (*A. chinensis*), however, both of our plants are males and will not fruit. Many sources report that males produce better leaf coloration than do female plants.

The third bamboo, *Shibataea kumasasa*, is a smaller plant which should reach about three feet in height. It has very slender canes and prominent nodes. The leaves are relatively large and broad for a bamboo. These plants will be allowed to form continuous masses on either side of the ramp. Our plants, from a Southern California source, arrived with considerable scorching on all leaves. When removed from their containers, most exhibited a

The purple moor grass, Molinia caerulea.

drawing: Sylvia Chesley Smith

solid mass of runners circling the root balls many times. These roots were broken open during planting. These roots suggests that it is more likely to act as a running bamboo than to be caespitose, as texts report it to be, and the new growth formed this year confirms that this may be the case.

The grasses in the southern bed consist of the *Molinia* described earlier, *Imperata cylindrica* 'Rubra', and *Sesleria autumnalis*. They have been planted in broad, overlapping bands and will provide bold and distinct masses of different color. The *Imperata*, or Japanese blood grass, has deep blood-red foliage. It is located under the maple trees and together they should form a striking combination of red colors in the fall which will contrast sharply with the light green foliage of the other two grasses. Although installed in very small sizes, the *Imperata* already shows signs of spreading and should form a continuous mass in the next year or two. The *Sesleria* is clump-

forming but appears to be relatively vigorous in its growth. All three grasses are deciduous.

As a counterpart to the black-leaved sedge *Ophiopogon*, *Carex morrowii* 'Aurea Variegata', has been planted in the cooler, shadier rock crevices around the south side of the Courtyard where it will lighten this area with bright flashes of its silvery-white variegated leaves. Another sedge, *Carex buchananii*, with brownish-orange leaves will be interplanted with the Japanese blood grass when stocks become available.

Another herbaceous plant, *Dierama pulcherrimum*, also with long, slender, grass-like foliage has been planted in the center of the northern bed which is the warmest part of the Courtyard. Pendant, purple to pink flowers are arranged along thin, arching stems which rise above the stiffly-erect masses of dull green foliage and give this beautiful plant its common name of wandflower. To maintain the grass-like foliage theme of the Courtyard, but provide splashes of seasonal color, a number of bulbs and corms will be planted throughout the beds. These include the very early flowering *Crocus tomasinianus* and *Leucojum aestivum*; later spring flowering *Camassia quamash*, and *C. leichtlinii* 'Plena' and summer and fall flowering *Triteleia laxa*, *Nerine bowdenii*, and a *Lilium* species.

As with all planting designs, the McVay Courtyard at the Center for Urban Horticulture is to some extent experimental in nature as it is never possible to predict exactly how all the plants will respond to the site conditions. In addition, there is always the opportunity to add to the design the inspired suggestions which visitors may offer. Already this small Courtyard has attracted more than its fair share of attention and comment. It is the hope of the landscape architects that its design and the choice of plants will, in the future, continue to excite the interest and pique the imagination of visitors.

The author wishes to acknowledge the valuable advice received by the Jones & Jones design team from a wide variety of people with very different areas of expertise. These included: Dr. Tukey and his faculty and staff at the Center, Brian Mulligan, Marvin Black, Eric Hoyte, Maureen Kruckeberg, and particularly Mrs. Pendleton Miller, who played a pivotal role during the planting design and plant selection process. The successful completion of any project also requires a conscientious contractor and the author wishes to acknowledge the outstanding work of Marenakos in the placement of the rocks and the willingness of Williams and Abbott and Corsan Construction to experiment and try new approaches during the construction of the Courtyard. The assistance of Fred Hoyt and Jim Fiore of the Center who, along with the author, got dirt under their fingernails as they placed the soil and installed the plants is also greatly appreciated.

Finally, the author wishes to acknowledge the generous donations to the Center that made the design and construction of the Courtyard possible. Principal among these was that of Mrs. John P. McVay. In addition, a gift from Mrs. Charles Cole for work at the front of the Center also assisted in the completion of the Courtyard. Plants were purchased through donations from the Lake Washington Garden Club and the Arboretum Foundation and actual plants were given by Gary Van Winkle of Stanwood Nursery, Peninsula Nursery in Sequim, Mrs. Earle W. Zinn, Mrs. Pendleton Miller, and Mrs. Arthur P. Gardiner.

Mushrooms

MARGARET E. DILLY

Margaret Dilly is immediate past president of the Puget Sound Mycological Society and a chair for that society's Conservation and Ecology committee. She is a member of the Department of Natural Resources Task Force and member and chair of the Citizens for Environmental Planning.

Someone has shared with you a top secret — an area where you are sure to find the chanterelle — that lovely mushroom smelling slightly of apricots. Alas you arrive, sure you have gone to the right spot, but no mushrooms. The ground is trampled which leads you to believe that someone arrived before you. Dissappointed, but determined, you move down the road to discoverd what has happened to the choice edibles you were after - large signs read "WE BUY CHANTERELLES". You were too late, the commercial pickers were there before you, not just today, but three days prior and they will be back three days hence. They invade every accessible area of the forest gathering mature and immature mushrooms alike, leaving nothing to regenerate the species with its spores.

Most of these mushrooms go to foreign markets. In Europe, wild mushrooms are a staple part of the diet. Due to poor forest management, limited forest areas, and acid rain, the demand for mushrooms is greater than the supply. Washington and Oregon have supplied hundreds of tons of wild mushrooms with the greatest amount being shipped to Germany. This is big business.

In the last few years that mycologists and environmentalists have become very alarmed by this massive exportation, they worry not only about the depletion of the species but the health of the forest. Those of us who have gathered mushrooms over the years as a hobby without impact to the forest became so incensed by the mass invasion and complete denudation of fungi from the forests that we have formed a group that meets regularly in an attempt to resolve the problems exportation have caused. We have adopted the acronym CEP, Citizens for Enviromental Planning with these purposes: To ensure protection and preservation of wild mushrooms, flora and fauna of the Pacific Northwest through proper education, legislation and management. This group generated a great deal of public interest and caught the eye of some of our State Legislators, which resulted in several public hearings on the subject. Two bills for the preservation

Oh, how we love them, not just because they are a wonderful addition to our gourmet concoctions but also for their beauty and mystery. Anyone can go to the grocery store and purchase cultivated mushrooms such as the common, *Agaricus bisporus* or the more exotic Shitake, *Lentinus edodes*, or the oyster, *Pleurotus ostreatus*. When in season one can even find wild varieties of fungi such as chanterelle, *Cantharellus cibarius* or matsutake, *Armillaria ponderosa*.. But going into their natural habitat and collecting them youself is the real pleasure.

More than 3,500 species occur in the Pacific Northwest from the ocean to the desert areas east of the mountains. They can be found almost anywhere, even in the cities. Many good edible mushrooms grow in lawns and cultivated areas, such as fairy ring, *Marasmius oreades*, and meadow mushrooms, *Agaricus campestris* At the edge of a lawn, near a deciduous tree, one may find a prince, *Agaricus augustus*. Pasture lands may abound in the horse mushroom, *Agaricus arvensis*. Forested areas however yield the greatest variety and seem also to harbor most of the poisonous species. Although there are very few of these in the Pacific Northwest one must be very careful for there are some mushrooms that are lethal. One must always be absolutely sure of the identity of mushrooms and cautious in their preparation before eating them. If you do not know anyone who can properly identify mushrooms contact your local mushroom society. In Seattle it is the Puget Sound Mycological Society, telephone number 783-4942.

of mushrooms were then drafted and introduced into the House of Representatives during the last State Legislative session. Simultaneously, the Department of Natural Resources was asked to set up a Task Force, which meets monthly to study the issue. This Task Force is made up of representatives from commercial interests, State, National, and private forests, mycological societies, a tree pathologist and a cultivator of exotic fungi.

After more than a year of meetings of both the Task Force and CEP the following findings were outlined:

1) Scientific studies are definitely necessary to determine the ramifications of over-harvest. This includes trampling effects on the forest, fungi and plants, as well as the threat to regeneration of mushrooms and the impact on small forest animals that rely on fungi for food.
2) Mushrooms are being harvested and sold from Federal, State and private lands with no revenue returned to the land owners.
3) Many small and large businesses dealing with buying and selling mushrooms are not properly licenced, and are thus circumventing the law.
4) No permits for harvesting have been issued in areas where it *is* required by law to have one.
5) No certified person, or persons, are identifying the mushrooms that are sold for human consumption, which raises the question of possible poisonings.
6) Regulation of any kind and its enforcement is not cost effective and virtually impossible at this point.
7) Alternatives are available that would help the unemployed who often gather mushrooms to support their families. Cultivation of exotic mushrooms is a growing business and in big demand. We are fortunate to have in our area a couple of knowledgeable people who could assist in setting up individuals in this business.

All of these things are important but answers are slow in coming. While we rassle with the problems, the commercial interests continue to reap the harvest and count up their profits with little or no regard for human health or that of the forest and its inhabitants.

The Unusual Winter of 1985-86

JAN PIRZIO-BIROLI

The author would like to thank Timothy Hohn, Brian Mulligan James Clark and George Pinhuy for their valuable help in making this article as accurate as possible.

The winter of 1985-86 was distinguished by two extremes, the sustained cold in November 1985, which culminated in a low of 9ºF on November 23, and a record rainfall of 55.8 m (about 2.25 inches) over the 24-hour period of January 18, 1986.

According to Professor Clifford Mass of the University's Department of Atmospheric Sciences, the January 18th rain was a "100-year storm". Since it was preceded the day before by an additional inch and a half, we had a total for 48 hours of 3 3/4 inches of rain. The most dramatic effect of this downpour occurred at the west end of the Woodland Garden where the lower pond overflowed, the water crossing Azalea Way and washing out the soil around the plantings on the other side. (On a more personal note, I might add that about 12 Continuing Education students and I were looking at conifers that morning- they had voted to stay despite the rain — and we passed that pond at about 11:30 when it was reaching flood stage. Dedicated plants lovers, brave people. It was wet out there!)

Two nights before the January 18th rainfall, a typical winter windstorm whipped through the Seattle area felling several trees in the Arboretum. A large spruce (*Picea montigena*) near the parking lot south of the nursery was broken off about four feet above the ground and fell into Arboretum Drive. Fortunately another, though much smaller specimen of the same accession number remains nearby, and the general effect has been to make the entire area lighter and more penetrable, thus offsetting the loss of a valuable tree. A western hemlock (*Tsuga heterophylla*) in the Witchhazel Section was uprooted, falling close to our rare specimens of *Parrotiopsis jacquemontiana*, breaking some limbs but at least not destroying the plants. An enormous cedar (*Thuja plicata*) was uprooted at the north end of Azalea Way, falling in a northwesterly direction through the planting of *Rhododendron augustinii* and again causing surprisingly little damage, although it did take a limb off a nearby flowering cherry.

A bigleaf maple (*Acer macrophyllum*) south of Loderi Valley had been scheduled to have a large, weak limb removed. Mother nature accomplished the task for us but not as neatly as we might have wished. A huge scar defaces the trunk of the maple itself, and two rhododendrons beneath it were injured, one being cut almost to the ground (hopefully it

will stump sprout) and the other having a few broken branches.

As for the November cold, damage to Arboretum collections may have been compounded by several factors:

1) The record cold of December 1983 (7ºF) had already killed or weakened many of our tender or borderline hardy plants.

2) July and August were months of prolonged heat and drought. Up to October 1st, Seattle had received only 57% of its normal amount of precipitation.

3) Before the long, early cold spell began on Novemeber 11th, we had had only two frosts in October (32º F on the 8th and 31º F on the 30th). Further, in mid-October and early November, we had experienced periods of unseasonally warm temperatures.

The result of this pattern of weather was that some deciduous trees throughout the city retained their leaves until the freezing weather in November despite the fact that neighbors of the same species were already leafless. I have spoken with several authorities on this subject including George Pinyuh of the King County Extension Service, and most of us speculate that possibly this was due to a combination of factors, especially the stress imposed by last summer's heat and drought combined with the lack of hard frosts in October that would have caused the abscission layer to form at the base of the petioles. Whatever the cause, these trees had not become dormant when the severe freeze occured in Novemeber, and often it has been these trees that have shown signs of freeze damage.

According to our records, between November 10th and December 3rd, nighttime (minimum) temperatures did not rise above freezing; and from November 21st through the first day of December, our maximum temperatures followed the same pattern with only one recording above 34º F on November 26th. After a brief respite the nighttime cold continued throughout December, although it was not more severe than might normally be expected in winter.

Few plants were killed outright unless they had been weakened already by the December 1983 freeze or other factors. The *Ceanothus* collection (a 1983 victim) has been decimated to the extent that our crew has removed or cut back to the ground nearly every plant. If we are to continue growing these beautiful plants, they must at least be replaced with new stock, and perhaps a new location would suit them better. The *Eucalyptus* have once more been cut to the ground and are stumpsprouting with the lone exception of the single *E. niphophila* near the Visitor Center. This magnificent tree was slightly burned in 1983, and a smaller plant to the south of it was killed. Hopefully the remaining specimen has escaped injury this time. It seems to be the hardiest species we grow.

Once again, many of the large-leaved rhododendrons on the Sino-Himalayan Hillside were heavily damaged. These members of the Falconeri and Grande Series (Subsections Falconera and Grandia) vary in hardiness, but generally are somewhat tender. The injury there was inconsistent, however, and could have depended upon any of several conditions: the age of the plant, its genetic complement (within as well as between species), or its location. For example, a young plant of *R. macabeanum* suffered severe leaf burn and several of its branches were killed, while others not far away remained in excellent condition. Despite the damage, it is expected that most of these plants will recover. Rhododendrons in general lost many flower buds to the freeze as well as sustaining slight to moderate leaf burn.

In the bed just north of Loderi Valley on Azalea Way and in the Sino-Himalaya Hillside, plants of *Pieris formosa* var. *forrestii* have been severely cut back.

Two Chilean natives on the east bank of the Pinetum, *Podocarpus andinus* and *Fitzroya cupressoides,* were either killed out - right or severely damaged by cold. One plant of *Podocarpus* seems to have survived with moderate damage. Another Southern Hemisphere native, *Corokia cotoneaster*, was killed in sheltered positions in the lath house on the south wall of the greenhouse has only a few live shoots. Surprisingly, the *Vitex agnus-castus*, which had nearly been lost to the December 1983 freeze, showed no sign of damage this year. All four species are known to be tender. Unfortunately the fitzroyas are extremely slow-growing and the few remaining propagules will take many years to achieve a usable size.

The rare, usually evergreen *Acer oblongum* above the parking lot at the head of Rhododendrom Glen was once more defoliated

as it was in 1983. It had lost one of its large branches after that freeze and one of its three trunks the following year. There are splits at the base of the two remaining trunks. Since this plant has been know to stumpsprout in the past, there may be hope for it if we lose the above-ground parts. In the meantime, cuttings were taken last year so as not to lose it altogether.

Leaf burn to evergreen plants is a typical response to freezing weather, especially when there is a bright sun with very cold temperatures. Besides the rhododendrons, others were hurt to a lesser or greater degree. The evergreen oaks above Lake Washington Boulevard at the south end of the Oak Section were burned but are showing signs of recovery. These young trees are situated on a very stressful site on a hillside, exposed to the afternoon sun and subject to the pollution from boulevard traffic, factors which may have compounded the problem of cold. *Nothofagus menziesii*, a semi-hardy native of New Zealand, was badly burned but not defoliated; it is showing new growth at the tips of most branches. That species and *N. fusca* were killed outright in the nursery. Both species of *Garrya* and their hybrid usually suffer some leaf burn in a hard winter, and this year was no exception. In addition, all of them lost flower buds except one plant of *G. fremontii* above the parking lot at the head of Rhododendrom Glen.

Other cold damage in the Arboretum was spotty. In the row of *Cotoneaster* bordering the Foster Island Road, two plants of *C. serotina* were cut nearly to the ground but are stumpsprouting while the other cotoneasters remain in fair condition. *Cotoneaster serotina* is a species that has been most severely infected by fireblight during the summer, and it may be that the resultant stress made it more vulnerable. A single *Carpinus* (*C. laxiflora*) at the north end of the peninsula that extends into the lagoons was cut to the ground and only a few sprouts remain at its base. The reason for this damage is unknown.

A swath of damage occurred north of Rhododendron Glen on both sides of the road. To the east, at the south end of the Leguminosae, a lot of dead wood had to be pruned out of the planting of *Sarcococca confusa*, although this species was not damaged elsewhere in the Arboretum. Across the road some plants of *Osmanthus suavis* and *Berberis x lologensis* required heavy pruning, while adjacent plants of the same accession number were untouched. All of the *Erica arborea* var. *alpina* in this area had to be pruned almost to the ground. All four taxa are recovering. One of the least expected and, perhaps most disturbing losses was two of three specimens of *Magnolia campbellii* var. *mollicomata* x *M. campbellii,* one in the Camellia Section and another in Loderi Valley. A third plant of this beautiful clone survives on the south bank of Loderi Valley, but because of its location it can never become the effective specimen that the others were. The jury is still out upon whether this loss was due too the freeze or to a pathogen. We have consulted Dr. Ralph Byther, of the Extension Center at Puyallup about this problem.

Since last winter, several noticeable losses have occurred that deserve mention, especially because they were not directly caused by the cold although this might have appeared to be the case. In the hybrid *Rhododendron* planting south of Loderi Valley two native maples (*Acer macrophyllum*) have been struck by honey fungus (*Armillaria mellea*). One is dead; the other nearly so. Two beautiful *Prunus sargentii* in the vicinity have suffered the same fate. By the time this is published, all of these trees will have been removed in the hope of containing the infection.

In the Peony Section an *Acer davidii* hybrid has died and another stripebark maple is senescent. The latter was obviously in trouble two years ago, but the loss of the hybrid is unexpected. The reason for these problems is unknown.

The winter of 1985-86 has indeed been an unusual one.

In the Arboretum...

The staff at the Arboretum has been concentrating their efforts during the summer on basic maintenance. Field bindweed (Convolvulus arvensis) and annual geranium (Geranium robertianum) made an all-out assault on the Arboretum collections this year, particularly along Azalea Way. Fred Mauch and Bob Hilzinger have been keeping these weedy pests at bay by judiciously mulching beds and roguing out weeds.

Phil Renfrow, Horticultural Lead has been pruning and thinning many of the larger trees in the Arboretum with the help of graduate student/arborist John Hushagen. Trees along Azalea Way and close to Arboretum Drive have been our top priority. In addition, many of the weeping cherries, *Prunus subhirtella* 'Pendula', along Azalea Way have been heavily pruned to encourage new growth and remove limbs and branches infected with brown blossom rot — a chonic fungus disease of prunus. Tree maintenance will continue to be a priority in order to preserve unusual species of trees and maintain the lofty, green canopy which is characteristic of the Arboretum's pleasant ambiance.

Some of you may have noticed that the rock garden at the south end of Arboretum Drive has reappeared! Supervisor Dick Hart and Phil Renfrow directed our summer interns in the clean-up of this area. Many unusual species struggling to compete with weeds and vigorous neighbors have been liberated to the light of day. Some of the more interesting plants to observe there are *Quercus vaccinifolia*, *Dasylirion wheeleri*, *Nolina longifolia*, and several species of *Erica*.

Spring cleaning has come early to the Arboretum greenhouses. Dean Powell and Barb Engler are spearheading a reorganization effort in the propagation and nursery operations. This

Geranium robertianum

process has begun with the transfer of excess, decadent and inappropriate plants to new homes. The objective is to develop a streamlined operation for the replacement of Arboretum collections, propagation of new material, propagation trials and the production of plants worthy of introduction.

The effects of our long summer drought on Arboretum collections were buffered by our irrigation system. David Zuckerman did a fine job of maintaining adequate soil moisture by monitoring and adjusting our irrigation system and using supplementary sprinklers where necessary.

Timothy Hohn, Curator

Book Review

Manual of Cultivated Broadleaved Trees and Shrubs, Vol I (A-D), by Gerd Krussmann; translated by Michael E. Epp. Published by Timber Press, Portland, Oregon, 1984. 448 pages, illustrated with drawings and photographs. Price $65.00.

Dr. Krussmann's monumental work, originally published in German in 1976 and twice revised subsequently, has been the Bible on this important subject ever since its first appearance. It has naturally been of particular importance to European institutions, students and nurserymen, but also for those in English speaking countries either able to read German or have parts translated for them. The translator of this English edition, Michael Epp, at one time worked in the Botanical Garden at Dortmund, where Dr. Krussmann was formerly Director and a recognized world-wide authority on woody plants of temperate regions. The technical editor was Dr. Gilbert S. Daniels.

The book begins with a 31 page "Guide to Terminology" defining and illustrating those terms that apply to woody plants; this will be particularly useful to botany students of all ages. This is followed by a table of equivalent botanical terms in five languages — English, Latin, German, French and Dutch (especially for the use of European readers) that covers 6 1/2 pages, or about 360 entries, from "Abscissing" to "Woolly". There is an "Explanation of Symbols" used in the text, which covers such factors as light and soil requirements, ornamental flowers, foliage or fruits, etc. References to illustrations are indicated by key letters and numerals. Then three full-page maps show temperature zones for Europe, North America and China, with relative figures supplied in both Fahrenheit and Celsius scales. These maps are chiefly valuable for broad comparisons of the climatic zones in each continent, less so for local details. An extensive list of "Abbreviations to Other Reference Works" covers more than two pages; in the text these will be found at the end of the plant descriptions; e.g. *Acacia retinodes*. B.M. 9177; P. Sw 16. (*Botanical Magazine* pl. 9177; Polunin; *Flowers of Southwest Europe*, pl. 16).

In this first volume the plant

Flower forms of Camellia japonica.

descriptions start with *Abelia* on page 50 and end with *Duranta* on page 448. Other volumes will follow. For the larger genera information from the most recent study or monograph is provided according to their subdivisions, as well as keys to the species where available. Some of the larger genera so treated are *Acer*, *Berberis*, *Betula*, *Clematis*, *Cotoneaster*, *Deutzia* and *Cytisus*. Long lists, with short descriptions of cultivars, are supplied for the last four genera mentioned, and also for *Calluna* and *Chaenomeles*. These should be of particular value for nurserymen trying to identify clones with lost or wrong names. If keys were not available the author has grouped together related species to aid in their identification before proceeding to the individual descriptions and the related illustrations.

For example, *Acanthopanax* is subdivided into six sections, based on work by

Prof. H.A. Harms, (1918), according to their branch and flower characters. Nine of the 25 species described are illustrated by line drawings. References to Harms' work, and another by H.L. Li, are given at the end of the article. Forty-four pages are devoted to classifying the large and horticulturally important maple, genus *Acer*, following the studies of Dr. P.C. de Jong of Wageningen, Holland. Some are illustrated by black-and-white photos as well as by drawings of flowers and fruits. Leaf prints of some thirty species, arranged on three plates, are useful for comparisons of cultivars in such species as *A. palmatum*, *A. platanoides* and *A. pseudoplatanus* (the Norway and Sycamore maples) — a very comprehensive and valuable resource to growers of these trees.

The genus *Berberis* is also treated in considerable detail (26 pages), no doubt in view of its greater use in European gardens where wheat rust is not a problem. Here are ten plates of leaf prints showing two or more leaves of each species, lists of cultivars and descriptions of those derived from *B. thunbergii* and the hybrid *B. x stenophylla*, which are grown in this country. An extensive bibliography is added.

Black-and-white plates,176 in all, are scattered throughout the work in groups of 16. Some, chiefly the leaf prints, are full page; these are the most successful, followed by the half-page plates. When four to a page, some plates lack clarity or good definition.

Proof-reading appears to have been thorough and few spelling or other errors can be noted — *Casuarnia* for *Casuarina* on page 293; Rosceae for Rosaceae on page 443, and two occur amongst the maples on page 96 and 99.

This is unquestionably a work of the greatest value to all growers and students of woody plants. Volume II has now been published in English bringing us up to PRO - hopefully the third and final volume will appear in 1986 and the three can be placed together on library shelves for frequent consultation.

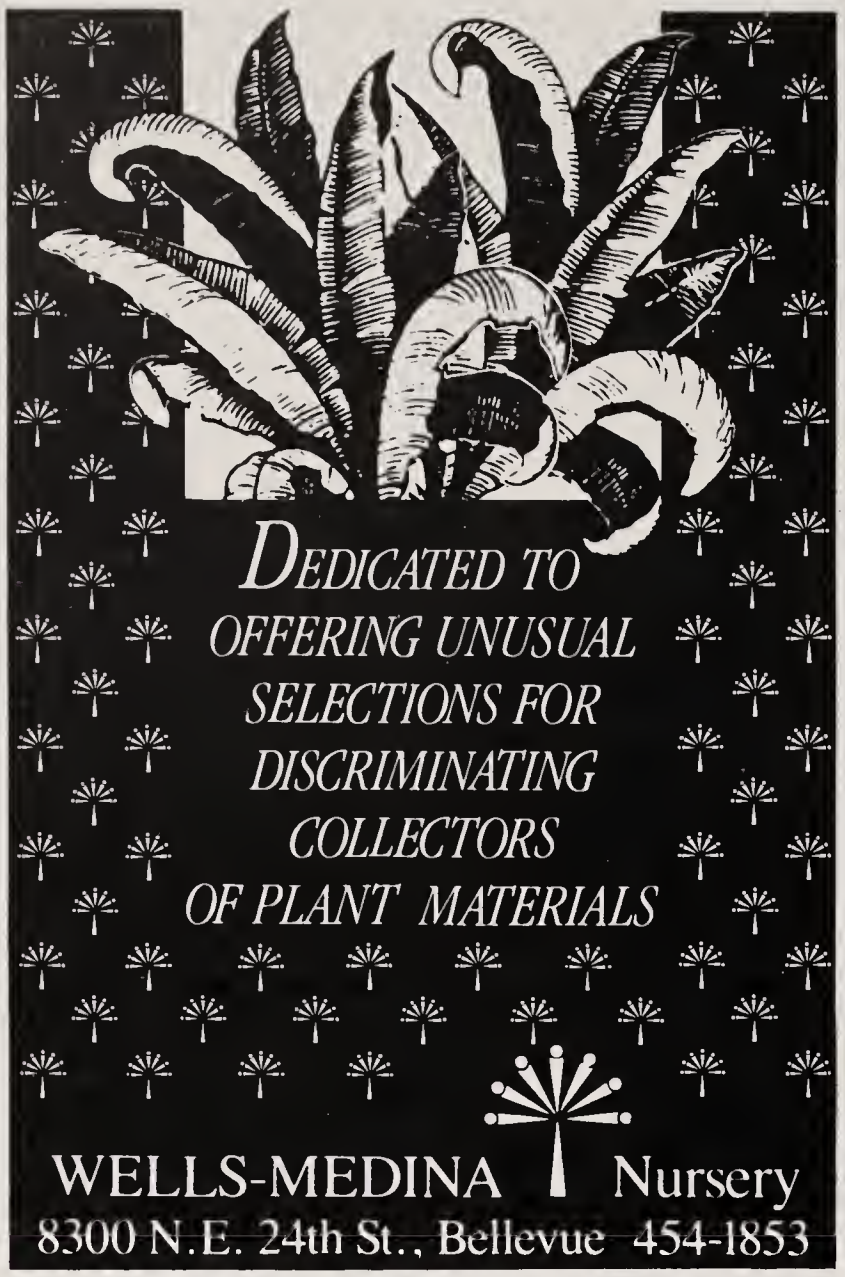
Brian O. Mulligan

Bamboo Corrections:

The following are corrections and updates for nomenclature in the arcticle "Introduction to Bamboo, Part II — Bamboos of Seattle", by Daphne Lewis in the Summer, 1986 issue of the *Arboretum Bulletin*. Listed below are the names as they appeared in the article along with the correct name. We acknowledge the assistance of Richard Haubrich of the American Bamboo Society in tracking down these names.

Arundinaria viridi-striata — *Arundinaria viridistriata*
Phyllostachys nigra v. 'Henon' — *Phyllostachys nigra* 'Henon'
Phyllostachys aureosulcata v. 'alata' — *Phyllostachys aureosulcata* f. *alata*
Arundinaria chino v. 'Vaginata variegata — *Pleioblastus chino*
var. *vaginatus* f. *variegatus*

Dr. Clement Hamilton



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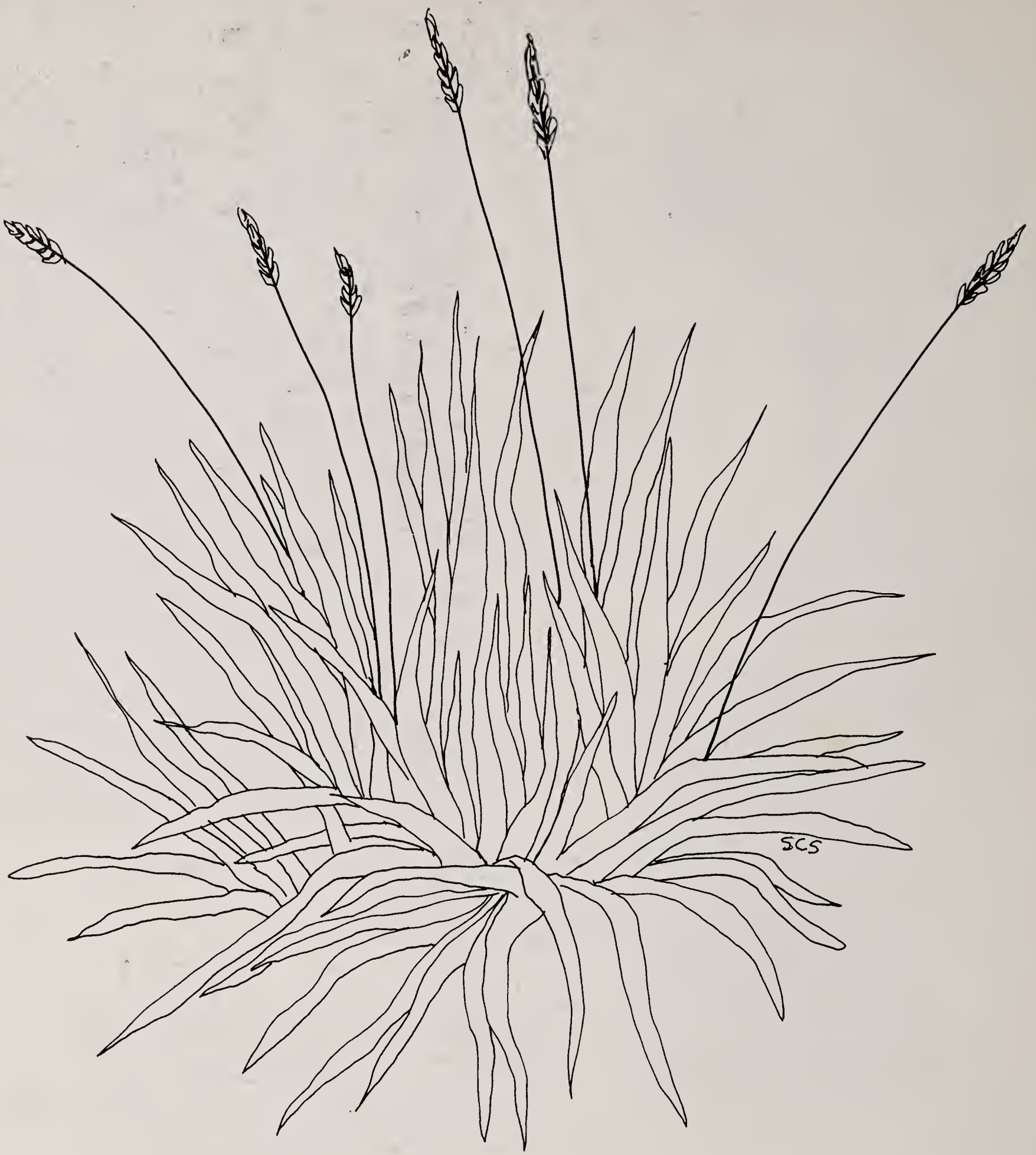

This beautiful glaucous blue grass, Koelerica glauca,
is planted in the McVay Courtyard. *See article on page 12.* *drawing: Sylvia Chesley Smith*

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